# Evaluation and Validation of the NRLPOM Relocatable Model

Germana Peggion
The University of Southern Mississippi
Bldg. 1103, Rm. 249, Stennis Space Center, MS 39529
phone: (228) 688-2897 fax: (228) 688-7072 e-mail: germana.peggion@usm.edu

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## LONG-TERM GOALS

The long-term objectives are to implement a user-friendly, computationally robust, and physically accurate modeling system to provide short-term forecast capabilities in support of real-time naval operations.

## OBJECTIVES

MODAS-NRLPOM is a scalable, portable, and rapidly relocatable system for nowcast and short term (2-day) forecast simulations. There are two major components: 1) the Modular Ocean Data Assimilation System (MODAS) to generate a nowcast field to initialize 2) the Naval Research Laboratory Princeton Ocean Model (NRLPOM).

The primary objective is to evaluate the operational system. There is a fundamental difference in assessing a predictive system in a research and in an operational mode. A research predictive system is designed, calibrated, and evaluated to encompass the dominant dynamics of a given region. The goal is to provide the *most accurate* representation of the dynamical features of a *specific* area. A predictive system, which supports operational applications, must be rapidly relocatable anywhere in the ocean (oil-spill and naval exercises are the most relevant applications), and easily reconfigured. The principal goal is to provide *good* representations *everywhere* with the available data (i.e., in spite of the lack of observations). In this respect, different metrics and criteria should define the evaluation of the two modeling approaches.

## APPROACH

Our work has focused on the evaluation of the physical accuracy of 1) MODAS nowcast and 2) NRLPOM forecast. The working hypothesis is that MODAS field is accurate enough to allow a dynamical model to spin up the correct physics in coastal and littoral regions. More specifically, we have performed real-time experiments and hindcast simulations in several areas and configurations, ranging from basin-scale to inlets, from deep to coastal domains.

## WORK COMPLETED

We have delivered to NRL the latest version of NRLPOM which includes new features implemented to increase the computer robustness and physical accuracy, such as: 1) initialization procedures, 2) tidal forcing, and 3) open boundary conditions (OBC).

# Report Documentation Page

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14. ABSTRACT
**The long-term objectives are to implement a user-friendly, computationally robust, and physically accurate modeling system to provide short-term forecast capabilities in support of real-time naval operations.**

15. SUBJECT TERMS

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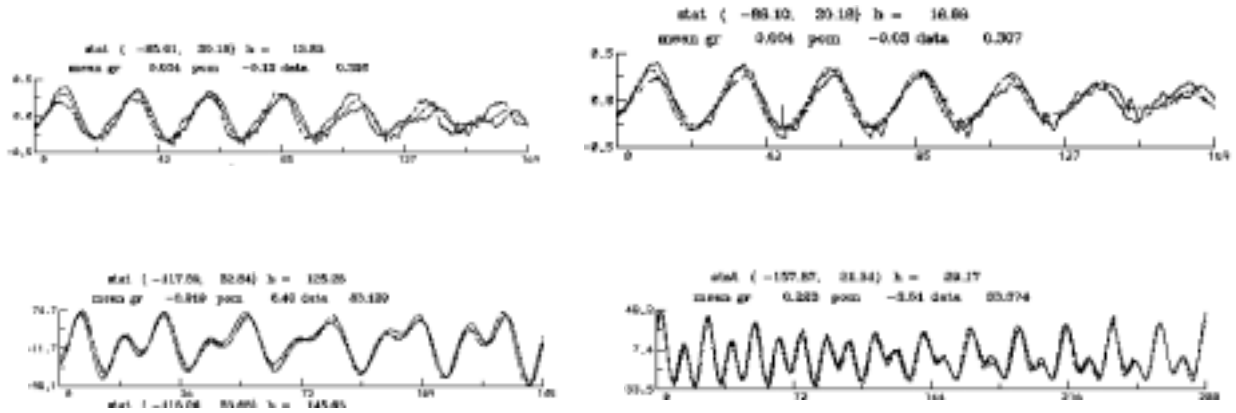

***Fig 3a: Comparison between the forecasted tidal amplitude and gauge data from several model simulations. A) Panama City, B) Pensacola, C) LaJolla, and D) Pearl* Harbor.**

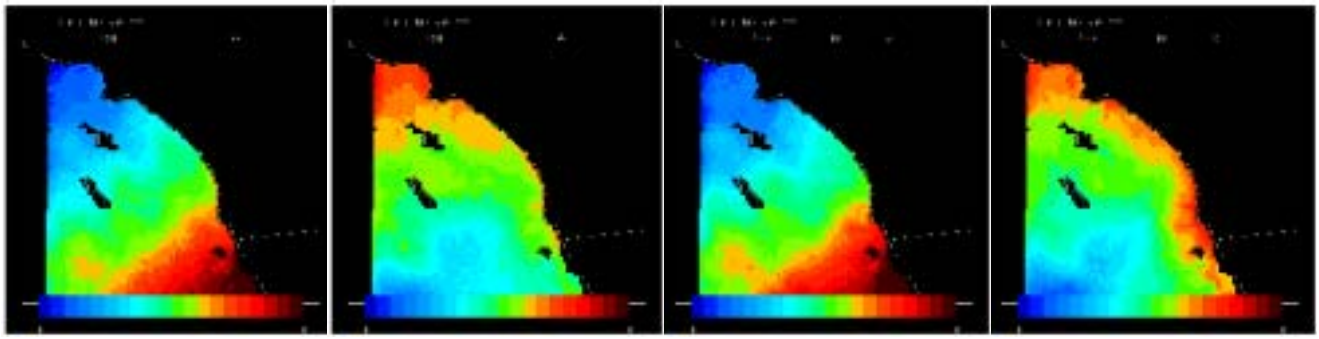

***Fig. 3b: The residual tidal circulation on the Southern California, Santa Barbara Channel region. Snapshots are every 6-hour interval.***

## IMPACT/APPLICATIONS

An earlier version of MODAS-NRLPOM is routinely applied at NAVO in several areas and configurations, ranging from basin-scale to inlets, from deep to coastal domains. MODAS-NRLPOM has been applied in support of the real-time Naval exercise Kernel Biltz 01 off the San Diego coast. The model is currently applied at NAVO in providing currents around the shallow Ehime Maru recovery site (specifically to assist in forecasting where oil and other items would drift).

## TRANSITION

Transition to NAVO is in progress.

## RELATED PROJECTS

This research provides a test bed for the development and evaluation the Distributed Environmental Forecast System (DMEFS) framework. The research is the result of an active collaboration with NRL CODE-7320. Related projects include:

- 6.4 SPAWAR On-Scene Tactical Ocean Forecast Capability (D. Fox)
- Relocatable Models (R. Preller)

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